Downscaled GFS with Eta eXtension (DGEX)

- Background
  - Designed to bring quick relief to forecasters by giving physically consistent and seamless option for high resolution medium range forecast grids
- Summary of Model Run Design
  - Run Eta12 out to 192 hr on smaller domain using GFS lateral boundary conditions (LBC)
    - Analogous to downscaling GFS since GFS synoptic scale should dominate Eta solution within the small interior domain
    - Start DGEX at 78 hr to allow for adjustment to smaller grid by 84 hr (first time available)
    - 78-174 hr uses 3-hr GFS LBC; 174-192 hr uses 6-hr GFS LBC

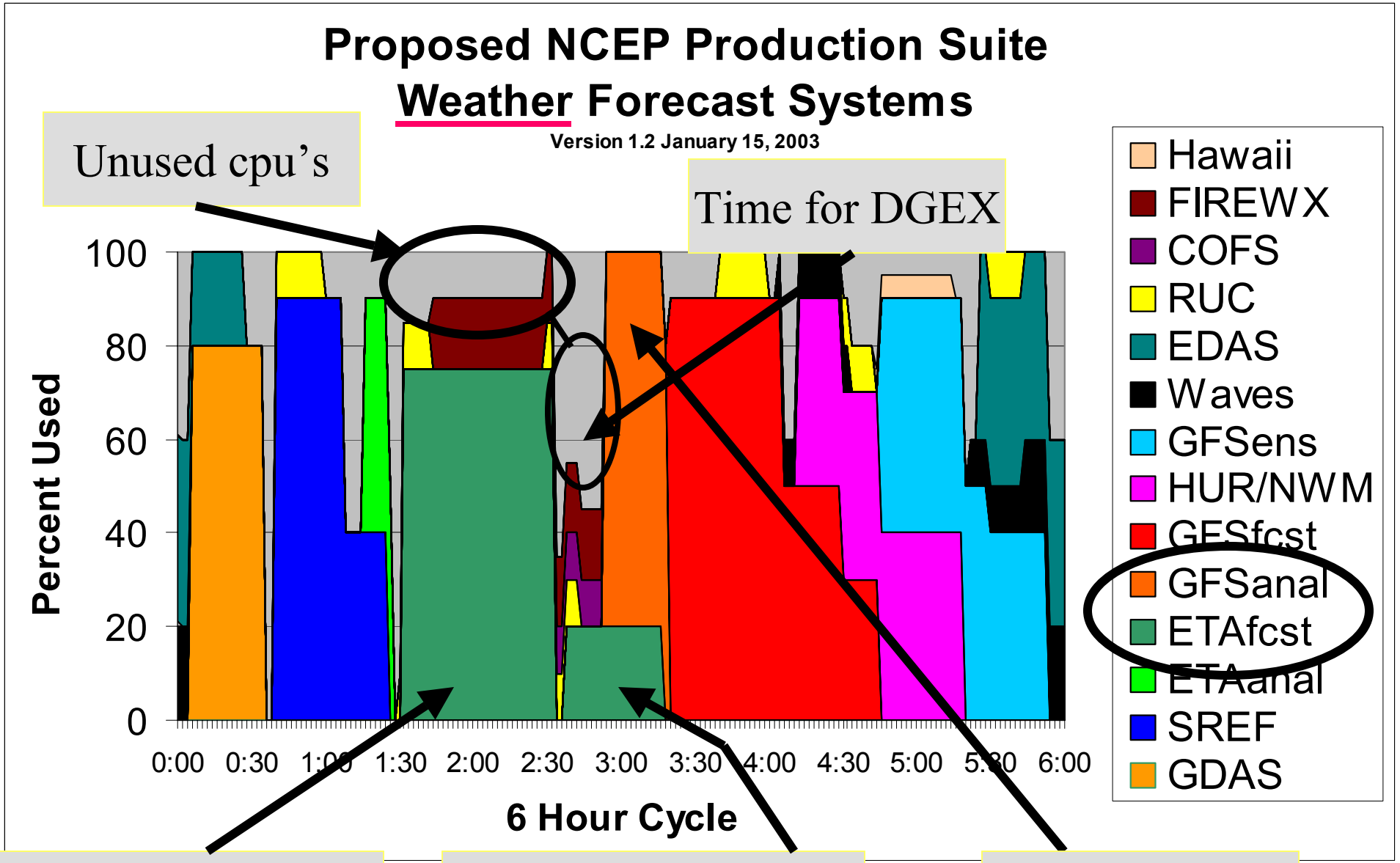
DGEX – Run Time Details

- Cycle times – run twice per day per grid
  - 06 and 18Z (00 and 12Z GFS LBC) for CONUS
    - Available ~10-12Z (06Z run) and ~20-0Z (18Z run)
  - 12 and 00Z (06 and 18Z GFS LBC) for OCONUS
  - Accommodates 18Z, day 8 grids timeliness deadline
    - Available ~4-6Z (00Z run) and ~16-18Z (12Z run)
- First Development Phase
  - Extend current 0-60 hr off-hour Eta out to 84 hr, freeing up current 60-84 hr Eta time slot for DGEX (April 2004)
- Initial Evaluation Phase (March-April 2004)
  - Single run per day off 00Z cycle for CONUS & AR
  - Run off EMC's 00Z parallel experimental Eta

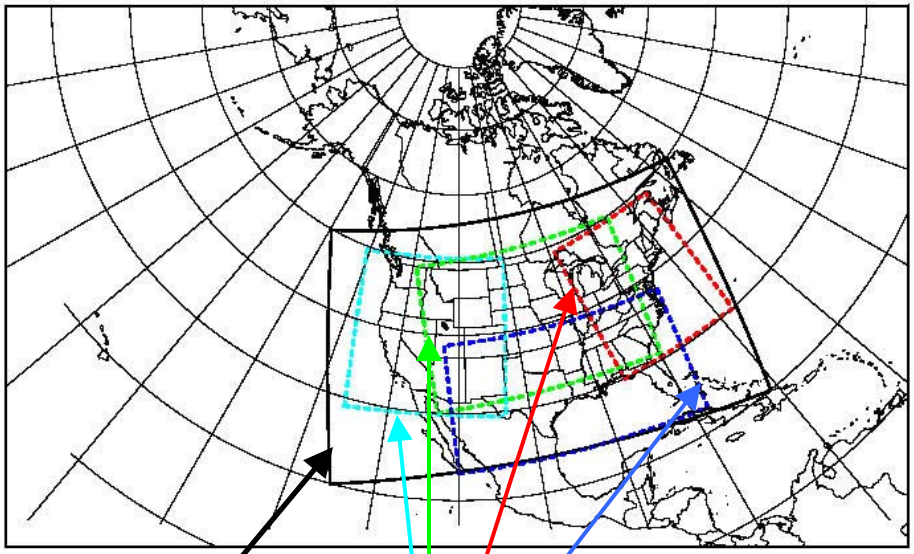
DGEX – Parameters

- Pressure at surface and MSL
- T and RH at 2 meter, 0-30mb, 30-60mb, 60-90mb, 90-120mb, 120-150mb
- U and V wind at 10m, 0-30mb, 30-60mb, 60-90mb, 90-120mb, 120-150mb
- Total Precip at surface
- Total Cloud Cover
- Max/Min temperature at 2 meter
- Weather Smart Init fields
  - Probability of Freezing Precip
  - Probability of Frozen Precip
  - Probability of Thunderstorms
- Terrain height (only once - not every time-step)
- Synoptic parameters (for assessment of model synoptics):
  - Sea Level Pressure
  - 1000 mb Z
  - 850, 700, 500 mb Z, T, RH, U, V
  - 700 mb omega
  - 250 mb Z, U, V
  - Surface based lifted index

Wx Production Suite Made Up of Four Uniform Cycles per Day



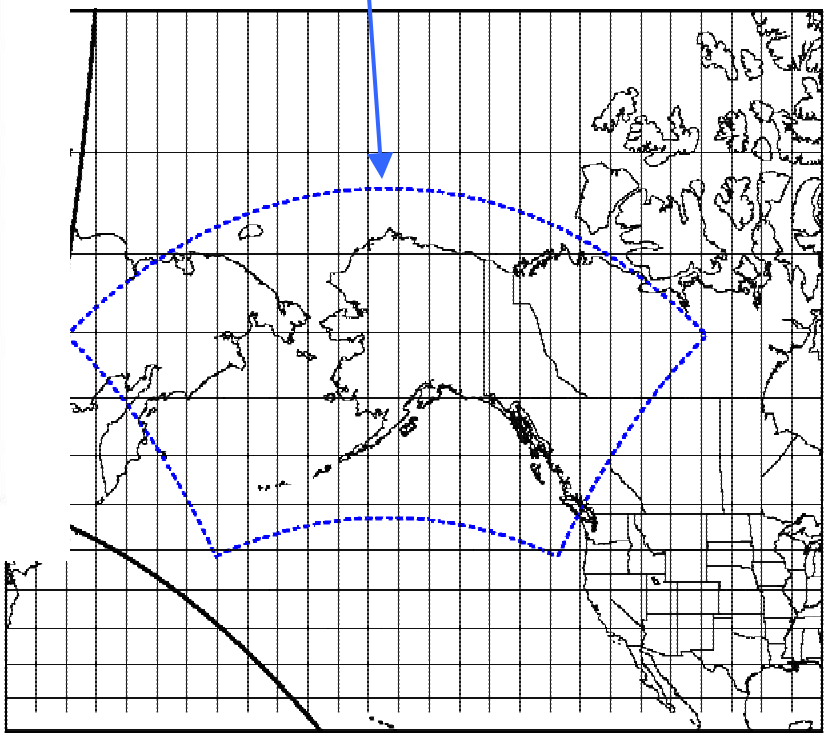
DGEX – Domains



CONUS Domain

Regional Distribution Tiles

Alaska Region Domain



Regional subsets only used during evaluation period when folks are getting files via ftp.

Final distribution will be on grid #218 with GRIB2 compression via new AWIPS SBN.

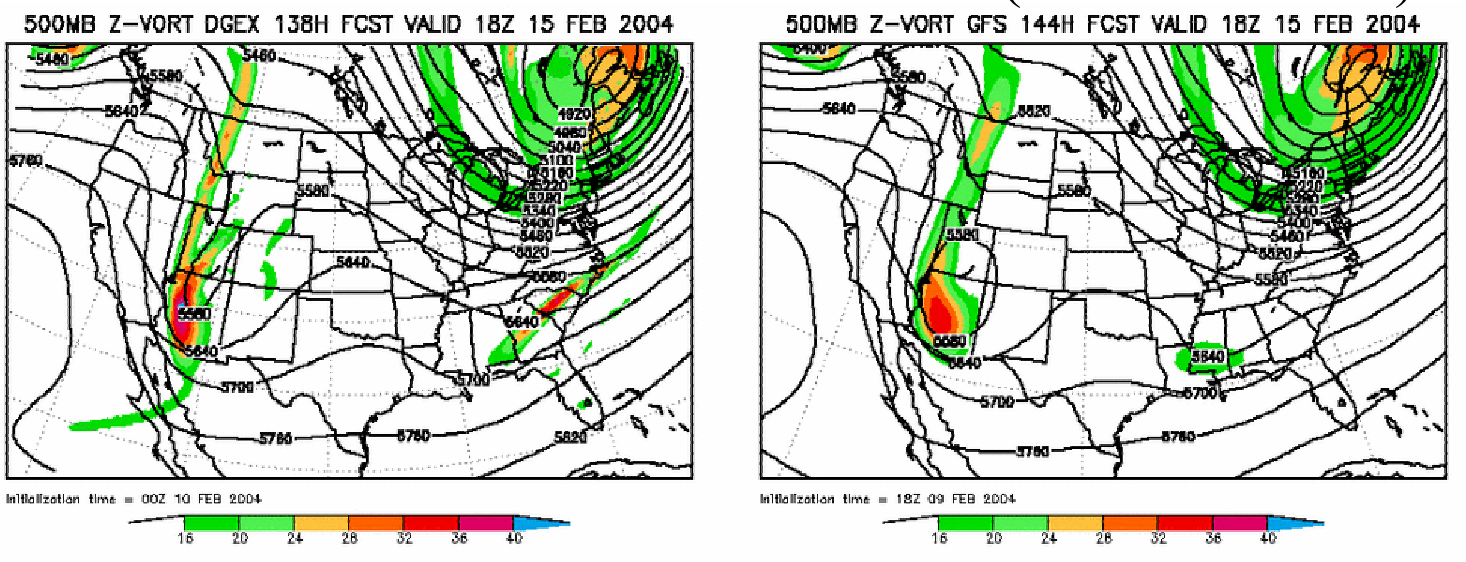
Will DGEX drift from GFS?

DGEX vs. GFS LBC run

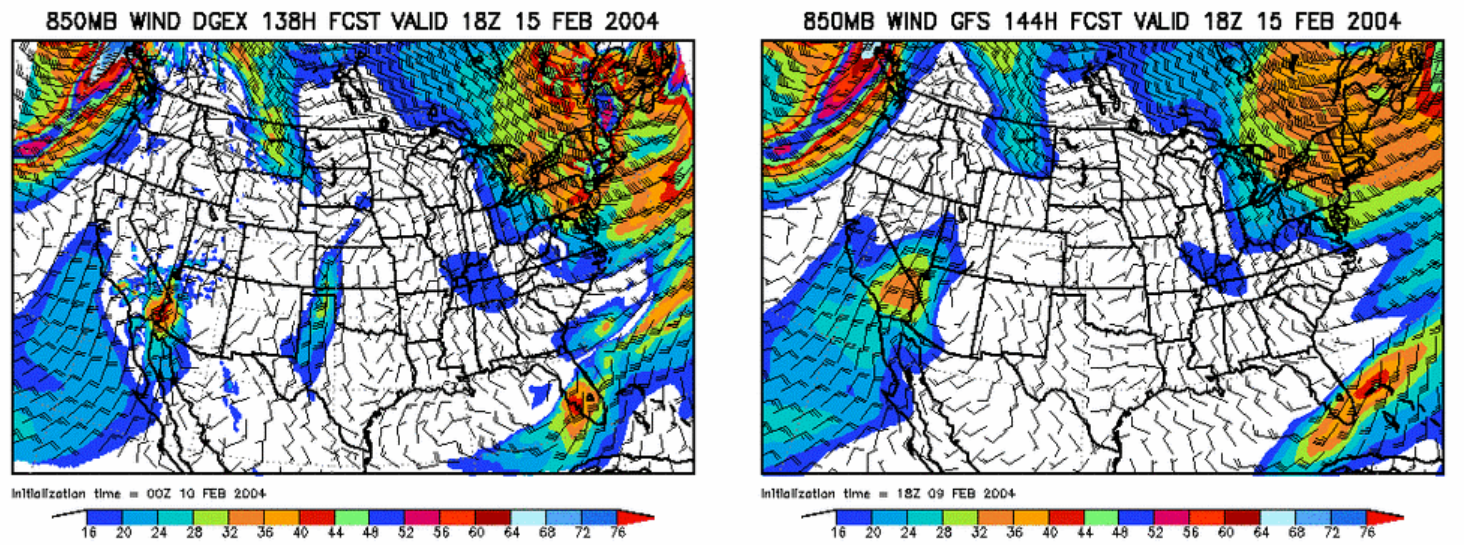
0Z DGEX

18Z GFS (used for LBCs)

500 mb ht/vort



850 mb wind



DGEX – Initial Steps

- Change Notification proceeding (consolidation of Eta run results in earlier delivery of current 0-84hr Eta)
- Test DGEX grids available to setup optimal baseline SmartInit
- EMC webpage comparing test run results

  http://wwwt.emc.ncep.noaa.gov/mmb/mmbpll/etapll8day/

  http://wwwt.emc.ncep.noaa.gov/mmb/mmbpll/etapll8day.ak/
- March 15 – April 15: testing and evaluation period
  - Regional WAN distribution method will be used for evaluation (facilitated by WR-SSD); although SBN solution will be used when fully operational
  - Forecasters at a subset of WFOs to assess impact on operations
  - Evaluate internal drift issues
  - Evaluate use in GFE and impact on WFO boundary discrepancies
  - HPC will perform model diagnostics

DGEX – SBN/AWIPS Timeline

- Mid April: convergence of Eta runs complete and DGEX running operationally
  - GRIB1 Regional distribution continues
- Late May: DVB-S efforts free up SBN bandwidth
- June: OB3.2 upgrade to AWIPS configuration
- June: DGEX operational via SBN using GRIB2
- Will eventually be replaced by more permanent downscaling solution(s)

- Note: Pacific Region and Puerto Rico DGEX runs are planned, but details still need to be worked out (will not be included in evaluation phase)